Cisco Catalyst 2960 Series Switches with LAN Lite Software

Cisco® Catalyst® 2960 Series Switches with LAN Lite software are fixed-configuration, standalone switches that provide desktop Fast Ethernet connectivity for entry-level wiring closet and small branch office networks. The Cisco Catalyst 2960 LAN Lite Series Switches simplify the migration from nonintelligent hubs and unmanaged switches to a fully scalable managed network. The LAN Lite Cisco IOS® Software provides entry-level security, quality of service (QoS), and availability capabilities while lowering the network total cost of ownership.

The Cisco Catalyst 2960 LAN Lite Switches offer:

- Dual-purpose uplinks for Gigabit Ethernet uplink flexibility, allowing use of either a copper or a fiber uplink: each dual-purpose uplink port has one 10/100/1000 Ethernet port and one Small Form-Factor Pluggable (SFP)-based Gigabit Ethernet port, with one port active at a time
- Scalable and secure network management
- Baseline Network Admission Control based on users, ports, and MAC addresses
- Easy network configuration, Cisco IOS Software updates, and troubleshooting using Cisco Network Assistant software
- Auto-configuration using Smartports
- Enhanced troubleshooting for link connectivity issues and cable diagnostics
- Quality of service and support for multicast services
- Limited lifetime hardware warranty
- Software updates at no additional cost

Figure 1. Cisco Catalyst 2960 LAN Lite Switches

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Configurations

The Cisco Catalyst 2960 LAN Lite Switches comprise the following switches (Figure 1):

- Cisco Catalyst 2960-24-S: 24 Ethernet 10/100 ports
- Cisco Catalyst 2960-24TC-S: 24 Ethernet 10/100 ports and 2 dual-purpose uplink ports (10/100/1000BASE-T or SFP)
- Cisco Catalyst 2960-48TC-S: 48 Ethernet 10/100 ports and 2 dual-purpose uplink ports;

The SFP-based Gigabit Ethernet ports accommodate Cisco 1000BASE-SX, 1000BASE-LX, and 100BASE-FX SFP transceivers.

Security

The Cisco Catalyst 2960 LAN Lite Switches support security features that help businesses protect important information, keep unauthorized people off the network, guard privacy, and maintain uninterrupted operation.

The Cisco Identity-Based Networking Services (IBNS) solution provides authentication, access control, and security policy administration to secure network connectivity and resources. Cisco IBNS in the Cisco Catalyst 2960 LAN Lite Series prevents unauthorized access and helps ensure that users get only their designated privileges. It provides the ability to dynamically administer granular levels of network access. Using the 802.1x standard and the Cisco Secure Access Control Server (ACS), users can be assigned a VLAN upon authentication, regardless of where they connect to the network. This setup allows IT departments to enable strong security policies without compromising user mobility, and with minimal administrative overhead.

Port security can be used to limit access on an Ethernet port based on the MAC address of the device to which it is connected. It also can be used to limit the total number of devices plugged into a switch port, thereby protecting the switch from a MAC flooding attack as well as reducing the risks of rogue wireless access points or hubs.

The MAC Address Notification feature can be used to monitor the network and track users by sending an alert to a management station so that network administrators know when and where users entered the network. Secure Shell Protocol Version 2 (SSHv2) and Simple Network Management Protocol Version 3 (SNMPv3) encrypt administrative and network-management information, protecting the network from tampering or eavesdropping. TACACS+ or RADIUS authentication enables centralized access control of switches and restricts unauthorized users from altering the configurations. Alternatively, a local username and password database can be configured on the switch itself. Fifteen levels of authorization on the switch console and two levels on the Web-based management interface provide the ability to give different levels of configuration capabilities to different administrators.

Availability and Scalability

The Cisco Catalyst 2960 LAN Lite Switches are equipped with features that allow for network scalability and higher availability through multicast filtering as well as a complete suite of Spanning Tree Protocol enhancements aimed to maximize availability in a Layer 2 network.

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Enhancements to the standard Spanning Tree Protocol, such as Per-VLAN Spanning Tree Plus (PVST+), UplinkFast, and PortFast, help to maximize network uptime. PVST+ allows for Layer 2 load sharing on redundant links to efficiently use the extra capacity inherent in a redundant design. UplinkFast, PortFast, and BackboneFast all greatly reduce the standard 30- to 60-second Spanning Tree Protocol convergence time. The Loopguard and bridge protocol data unit (BPDU) guard enhancements provide Spanning Tree Protocol loop avoidance.

Quality of Service

The Cisco Catalyst 2960 LAN Lite Switches offer QoS features to help ensure that network traffic is classified and prioritized and that congestion is avoided in the best possible manner. To implement QoS, the Cisco Catalyst 2960 Series Switch first identifies traffic flows or packet groups, then classifies or reclassifies these groups using the 802.1p class of service (CoS) field. The Cisco Catalyst 2960 LAN Lite Switches support four egress queues per port, giving network administrators more control in assigning priorities for the various applications on the LAN. At egress, the switch performs congestion control and scheduling, the algorithm or process that determines the order in which queues are processed. The Cisco Catalyst 2960 LAN Lite Switches support Shaped Round Robin (SRR) and strict priority queuing. The SRR algorithm helps ensure differential prioritization.

Management

The new Express Setup feature simplifies the initial configuration of a switch. Now you can set up the switch through a Web browser, eliminating the need for terminal-emulation programs and the command-line interface (CLI). Express Setup reduces the cost of deployment by helping less-skilled personnel quickly and easily set up switches.

Cisco Network Assistant is a PC-based network-management application optimized for LANs with up to 250 users. Cisco Network Assistant offers centralized management of Cisco switches, routers, and WLAN access points. It supports a wide range of Cisco Catalyst intelligent switches from Cisco Catalyst 2960 through the Cisco Catalyst 4506 Switch. Through a user-friendly GUI, users can configure and manage a wide array of switch functions and start the device manager of Cisco routers and Cisco wireless access points. A few mouse clicks enable the Cisco recommended security, availability, and QoS features without the need to consult a detailed design guide. The Security wizard automatically restricts unauthorized access to servers with sensitive data. Smartports and wizards save time for network administrators, reduce human errors, and help ensure that the configuration of the switch is optimized for these applications. Available at no cost, Cisco Network Assistant can be downloaded from the Cisco Website.

In addition to Cisco Network Assistant, Cisco Catalyst 2960 LAN Lite Switches provide for extensive management using SNMP network-management platforms such as the CiscoWorks LAN Management Solution (LMS). LMS is a suite of powerful management tools that simplify the configuration, administration, monitoring, and troubleshooting of Cisco networks. It integrates these capabilities into a world-class solution for improving the accuracy and efficiency of your operations staff, while increasing the overall availability of your network. LMS supports over 400 different device types, providing:

- Network discovery, topology views, end-station tracking, and VLAN management
- Real-time network fault analysis with easy-to-deploy device-specific best-practice templates

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- Hardware and software inventory management, centralized configuration tools, and Syslog monitoring
- Network response time and availability monitoring and tracking
- Real-time device, link, and port traffic management, analysis, and reporting

Table 1 gives the features and benefits of the Cisco Catalyst 2960 LAN Lite Switches. Table 2 gives the hardware specifications, and Table 3 gives the power specifications. Table 4 lists the management and standards support, and Table 5 provides the safety and compliance information.

Table 1. Features and Benefits of Cisco Catalyst 2960 LAN Lite Switches

Feature	Benefit
Ease of Use and Deployment	• Express Setup simplifies initial configuration with a Web browser, eliminating the need for more complex terminal emulation programs and CLI knowledge. • DHCP autoconfiguration of multiple switches through a boot server eases switch deployment. • Autosensing on each 10/100 port detects the speed of the attached device and automatically configures the port for 10- or 100-Mbps operation, easing switch deployment in mixed 10- and 100-Mbps environments. • Autonegotiating on all ports automatically selects half- or full-duplex transmission mode to optimize bandwidth. • Dynamic Trunking Protocol (DTP) helps enable dynamic trunk configuration across all switch ports. • Port Aggregation Protocol (PAgP) automates the creation of Cisco Fast EtherChannel® groups or Gigabit EtherChannel groups to link to another switch, router, or server. • Link Aggregation Control Protocol (LACP) allows the creation of Ethernet channeling with devices that conform to IEEE 802.3ad. This feature is similar to Cisco EtherChannel technology and PAgP. • DHCP Server enables a convenient deployment option for the assignment of IP addresses in networks that do not have without a dedicated DHCP server. • DHCP Relay allows a DHCP relay agent to broadcast DHCP requests to the network DHCP server. • 1000BASE-SX, 1000BASE-LX/LH, and 100BASE-FX physical interface support through a field-replaceable SFP module provides flexibility in switch deployment. • The default configuration stored in flash memory helps ensure that the switch can be quickly connected to the network and can pass traffic with minimal user intervention. • Automatic medium-dependent interface crossover (Auto-MDIX) automatically adjusts transmit and receive pairs if an incorrect cable type (crossover or straight-through) is installed on a copper port. • Time-domain reflectometer (TDR) to diagnose and resolve cabling problems on copper ports. • Configuration Rollback provides the capability to replace the current running configuration with any saved Cisco IOS Software configuration file. This functionality can be used to revert to a previous configuration state, effectively rolling back any configuration changes that were made since that configuration file was saved. (future) • DHCP Auto Install (Boot Host DHCP) and Auto Image Update allows the switch to automatically download a configuration file and Cisco IOS Software image (future).
Manageability	

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Superior Manageability	• Cisco IOS Software CLI support provides a common user interface and command set with all Cisco routers and Cisco Catalyst desktop switches. • VLAN trunks can be created from any port using standards-based 802.1q tagging. • Up to 64 VLANs per switch and up to 64 spanning-tree instances per switch are supported. • Four thousand VLAN IDs are supported. • Voice VLAN simplifies telephony installations by keeping voice traffic on a separate VLAN for easier administration and troubleshooting. • Cisco VTP supports dynamic VLANs and dynamic trunk configuration across all switches. • IGMPv3 snooping provides fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors. • For enhanced traffic management, monitoring, and analysis, the Embedded Remote Monitoring (RMON) software agent supports four RMON groups (history, statistics, alarms, and events). • Layer 2 trace route eases troubleshooting by identifying the physical path that a packet takes from source to destination. • All RMON groups are supported through a SPAN port, which permits traffic monitoring of a single port, or a group of ports, from a single network analyzer or RMON probe. • Domain Name System (DNS) provides IP address resolution with user-defined device names. • Trivial File Transfer Protocol (TFTP) reduces the cost of administering software upgrades by downloading from a centralized location. • Network Timing Protocol (NTP) provides an accurate and consistent timestamp to all intranet switches. • Multifunction LEDs per port for port status; half-duplex and full-duplex mode; and 10BASE-T, 100BASE-TX, and 1000BASE-T indication as well as switch-level status LEDs for system, and redundant power supply, provide a comprehensive and convenient visual management system. • Cisco Discovery Protocol Versions 1 and 2 help enable automatic switch discovery for network management tools and communicate Voice VLAN information with Cisco IP phones. • Link Layer Discovery Protocol (LLDP) exchanges link and device information in multi-vendor networks.
Cisco Network Assistant Software	• Cisco Network Assistant is a no-charge, Windows-based application that simplifies the administration of networks of up to 250 users. It supports a wide range of Cisco Catalyst intelligent switches. With Cisco Network Assistant, users can manage Cisco Catalyst switches and launch the device managers of Cisco integrated services routers and Cisco Aironet® WLAN access points. • The easy-to-use graphical interface provides both a topology map and front-panel view of the cluster and stacks. • Configuration wizards need just a few user inputs to automatically configure the switch to optimally handle different types of traffic: voice, video, multicast, and high-priority data. • A security wizard is provided to restrict unauthorized access to applications, servers, and networks. • Upgrading the Cisco IOS Software on Cisco Catalyst switches is a simple matter of pointing and clicking, with one-click upgrades. • Multidevice and multiport configuration capabilities allow administrators to save time by configuring features across multiple switches and ports simultaneously. • The user-personalized interface allows modification of polling intervals, table views, and other settings. • Alarm notification provides automated e-mail notification of network errors and alarm thresholds.
Cisco Express Setup	• Express Setup simplifies initial configuration of a switch through a Web browser, eliminating the need for terminal emulation programs and CLI knowledge. • The Web interface helps less-skilled personnel quickly and simply set up switches, thereby reducing the cost of deployment.
CiscoWorks Support	• CiscoWorks network-management software provides management capabilities on a per-port and per-switch basis, providing a common management interface for Cisco routers, switches, and hubs. • SNMPv1, v2c, and v3 and Telnet interface support delivers comprehensive in-band management, and a CLI-based management console provides detailed out-of-band management. • Cisco Discovery Protocol Versions 1 and 2 help enable a CiscoWorks network-management station for automatic switch discovery. • The CiscoWorks LAN Management Solution supports the Cisco Catalyst 2960 Series.
Availability and Scalability	

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Superior Redundancy for Fault Backup	• Cisco UplinkFast and BackboneFast technologies help ensure quick failover recovery, enhancing overall network stability and reliability. • IEEE 802.1w Rapid Spanning Tree Protocol provides rapid spanning-tree convergence independent of spanning-tree timers and the benefit of distributed processing. • Per-VLAN Rapid Spanning Tree Plus (PVRST+) allows rapid spanning-tree reconvergence on a per-VLAN spanning-tree basis, without requiring the implementation of spanning-tree instances. • Command-switch redundancy enabled in Cisco Network Assistant software allows designation of a backup command switch that takes over if the primary command switch fails. • Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD allow unidirectional links to be detected and disabled to avoid problems such as spanning-tree loops. • Switch port autorecovery (errdisable) automatically attempts to re-enable a link that is disabled because of a network error. • Bandwidth aggregation up to 8 Gbps through Cisco Gigabit EtherChannel technology and up to 800 Mbps through Cisco Fast EtherChannel technology enhances fault tolerance and offers higher-speed aggregated bandwidth between switches and to routers and individual servers.
Integrated Cisco IOS® Software Features for Bandwidth Optimization	• Per-port broadcast, multicast, and unicast storm control prevents faulty end stations from degrading overall systems performance. • IEEE 802.1d Spanning Tree Protocol support for redundant backbone connections and loop-free networks simplifies network configuration and improves fault tolerance. • PVST+ allows for Layer 2 load sharing on redundant links to efficiently use the extra capacity inherent in a redundant design. • IEEE 802.1s Multiple Spanning Tree Protocol allows a spanning-tree instance per VLAN, enabling Layer 2 load sharing on redundant links. • Local Proxy Address Resolution Protocol (ARP) works in conjunction with Private VLAN Edge to minimize broadcasts and maximize available bandwidth. • VLAN1 minimization allows VLAN1 to be disabled on any individual VLAN trunk link. • VLAN Trunking Protocol (VTP) pruning limits bandwidth consumption on VTP trunks by flooding broadcast traffic only on trunk links required to reach the destination devices. • Internet Group Management Protocol (IGMP) Version 3 snooping provides fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors. • IGMP filtering provides multicast authentication by filtering out no subscribers and limits the number of concurrent multicast streams available per port.
QoS and Control	
Advanced QoS	• Standard 802.1p CoS field classification is provided. • Four egress queues per port enable differentiated management of up to four traffic types. • SRR scheduling ensures differential prioritization of packet flows by intelligently servicing the ingress and egress queues. • Weighted tail drop (WTD) provides congestion avoidance at the ingress and egress queues before a disruption occurs. • Strict priority queuing guarantees that the highest-priority packets are serviced ahead of all other traffic.
Security	

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Networkwide Security Features	• IEEE 802.1x allows dynamic, port-based security, providing user authentication. • IEEE 802.1x with VLAN assignment allows a dynamic VLAN assignment for a specific user regardless of where the user is connected. • IEEE 802.1x with voice VLAN permits an IP phone to access the voice VLAN irrespective of the authorized or unauthorized state of the port. • IEEE 802.1x and port security are provided to authenticate the port and manage network access for all MAC addresses, including those of the client. • IEEE 802.1x with Guest VLAN allows guests without 802.1x clients to have limited network access on the guest VLAN. • MAC Auth Bypass (MAB) for voice allows third-party IP phones without an 802.1x supplicant to get authenticated using their MAC address. • Unicast MAC filtering prevents the forwarding of any type of packet with a matching MAC address. • Unknown unicast and multicast port blocking allows tight control by filtering packets that the switch has not already learned how to forward. • SSHv2 and SNMPv3 provide network security by encrypting administrator traffic during Telnet and SNMP sessions. SSHv2 and the cryptographic version of SNMPv3 require a special cryptographic software image because of U.S. export restrictions. • Bidirectional data support on the Switched Port Analyzer (SPAN) port allows the Cisco Secure intrusion detection system (IDS) to take action when an intruder is detected. • TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration. • MAC address notification allows administrators to be notified of users added to or removed from the network. • Port security secures the access to an access or trunk port based on MAC address. • After a specific timeframe, the aging feature removes the MAC address from the switch to allow another device to connect to the same port. • Multilevel security on console access prevents unauthorized users from altering the switch configuration. • The user-selectable address-learning mode simplifies configuration and enhances security. • BPDU Guard shuts down Spanning Tree Protocol PortFast-enabled interfaces when BPDU's are received to avoid accidental topology loops. • Spanning-Tree Root Guard (STRG) prevents edge devices not in the network administrator's control from becoming Spanning Tree Protocol root nodes. • Voice VLAN aware port security and BPDU Guard allow Voice VLAN traffic to not be disrupted when security violations occur. • IGMP filtering provides multicast authentication by filtering out no subscribers and limits the number of concurrent multicast streams available per port. • Dynamic VLAN assignment is supported through implementation of VLAN Membership Policy Server (VMPS) client functions to provide flexibility in assigning ports to VLANs. Dynamic VLAN helps enable the fast assignment of IP addresses. • Cisco Network Assistant software security wizards ease the deployment of security features for restricting user access to a server as well as to a portion of or the entire network.

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Table 2. Cisco Catalyst 2960 LAN Lite Switch Hardware

Description	Specification
Performance	• 16 Gbps switching fabric (Catalyst 2960-24-S, Catalyst 2960-24TC-S, Catalyst 2960-48TC-S) • Forwarding rate based on 64-byte packets: • Catalyst 2960-24-S: 3.6 Mpps • Catalyst 2960-24TC-S: 6.5 Mpps • Catalyst 2960-48TC-S: 10.1 Mpps • 64 MB DRAM • 32 MB flash memory • Configurable up to 8000 MAC addresses • Configurable up to 255 IGMP groups • Configurable maximum transmission unit (MTU) of up to 9000 bytes, with a maximum Ethernet frame size of 9018 bytes (Jumbo frames) for bridging on Gigabit Ethernet ports, and up to 1998 bytes for bridging of Multiprotocol Label Switching (MPLS) tagged frames on both 10/100 and 10/100/1000 ports
Connectors and Cabling	• 10BASE-T ports: RJ-45 connectors, 2-pair Category 3, 4, or 5 unshielded twisted-pair (UTP) cabling • 100BASE-TX ports: RJ-45 connectors, 2-pair Category 5 UTP cabling • 1000BASE-T ports: RJ-45 connectors, 4-pair Category 5 UTP cabling • 1000BASE-T SFP-based ports: RJ-45 connectors, 4-pair Category 5 UTP cabling • 1000BASE-SX, -LX/LH SFP-based ports: LC fiber connectors (single/multimode fiber) • 100BASE-FX: LC fiber connectors (single/multimode fiber).
Power Connectors	• Customers can provide power to a switch only by using the internal power supply. The connector is located at the back of the switch. These switches do not have an RPS port. • The internal power supply is an autoranging unit. • The internal power supply supports input voltages between 100 and 240VAC. • Use the supplied AC power cord to connect the AC power connector to an AC power outlet.
Indicators	• Per-port status: Link integrity, disabled, activity, speed, full-duplex • System status: System, link status, link duplex, link speed
Dimensions (H x W x D)	Cisco Catalyst 2960-24-S: 1.73 x 17.5 x 9.3 in. (4.4 x 44.5 x 23.6 cm) Cisco Catalyst 2960-24TC-S: 1.73 x 17.5 x 9.3 in. (4.4 x 44.5 x 23.6 cm) Cisco Catalyst 2960-48TC-S: 1.73 x 17.5 x 9.3 in. (4.4 x 44.5 x 23.6 cm)
Weight	Cisco Catalyst 2960-24-S: 8 lb (3.6 kg) Cisco Catalyst 2960-24TC-S: 8 lb (3.6 kg) Cisco Catalyst 2960-48TC-S: 8 lb (3.6 kg)
Environmental Ranges	Operating temperature: 32 to 113°F (0 to 45°C) Storage temperature: –13 to 158°F (–25 to 70°C) Operating relative humidity: 10 to 85% (noncondensing) Operating altitude: Up to 10,000 ft (3049m) Storage altitude: Up to 15,000 ft (4573m)
Acoustic Noise	ISO 7779: Bystander position operating to an ambient temperature of 25°C Cisco Catalyst 2960-24-S: 40 dBa Cisco Catalyst 2960-24TC-S: 40 dBa Cisco Catalyst 2960-48TC-S: 40 dBa
Mean Time Between Failure (MTBF)	Cisco Catalyst 2960-24-S: 429,847 hrs Cisco Catalyst 2960-24TC-S: 403,745 hrs Cisco Catalyst 2960-48TC-S: 336,983 hrs

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Table 3. Power Specifications for Cisco Catalyst 2960 LAN Lite Switches

Description	Specification
Maximum Power Consumption	Cisco Catalyst 2960-24-S: 30W, 103 BTUs per hour Cisco Catalyst 2960-24TC-S: 30W, 103 BTUs per hour Cisco Catalyst 2960-48TC-S: 45W, 154 BTUs per hour
AC Input Voltage and Current	100-240VAC (autoranging), 1.3–0.8A, 50–60 Hz Inrush current < 30A at 115VAC and < 60A at 230VAC
Power Rating	Cisco Catalyst 2960-24-S: 0.05kVA Cisco Catalyst 2960-24TC-S: 0.05kVA Cisco Catalyst 2960-48TC-S: 0.075kVA

Table 4. Management and Standards Support for Cisco Catalyst 2960 LAN Lite Switches

Description	Specification	
Management	• BRIDGE-MIB • CISCO-CABLE-DIAG-MIB • CISCO-CDP-MIB • CISCO-CLUSTER-MIB • CISCO-CONFIG-COPY-MIB • CISCO-CONFIG-MAN-MIB • CISCO-ENTITY-VENDORTYPE-OID-MIB • CISCO-ENVMON-MIB • CISCO-ERR-DISABLE-MIB • CISCO-FLASH-MIB • CISCO-FTP-CLIENT-MIB • CISCO-IGMP-FILTER-MIB • CISCO-IMAGE-MIB • CISCO-IP-STAT-MIB • CISCO-LAG-MIB • CISCO-MAC-NOTIFICATION-MIB • CISCO-MEMORY-POOL-MIB • CISCO-PAGP-MIB • CISCO-PING-MIB • CISCO-PORT-QOS-MIB • CISCO-PORT-SECURITY-MIB • CISCO-PORT-STORM-CONTROL-MIB • CISCO-PRODUCTS-MIB • CISCO-PROCESS-MIB • CISCO-RTTMON-MIB • CISCO-SMI-MIB • CISCO-STP-EXTENSIONS-MIB • CISCO-SYSLOG-MIB	• CISCO-TC-MIB • CICSO-TCP-MIB • CISCO-UDLDP-MIB • CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB • CISCO-VLAN-MEMBERSHIP-MIB • CISCO-VTP-MIB • ENTITY-MIB • ETHERLIKE-MIB • IEEE8021-PAE-MIB • IEEE8023-LAG-MIB • IF-MIB • INET-ADDRESS-MIB • OLD-CISCO-CHASSIS-MIB • OLD-CISCO-FLASH-MIB • OLD-CISCO-INTERFACES-MIB • OLD-CISCO-IP-MIB • OLD-CISCO-SYS-MIB • OLD-CISCO-TCP-MIB • OLD-CISCO-TS-MIB • RFC1213-MIB • RMON-MIB • RMON2-MIB • SNMP-FRAMEWORK-MIB • SNMP-MPD-MIB • SNMP-NOTIFICATION-MIB • SNMP-TARGET-MIB • SNMPv2-MIB • TCP-MIB • UDP-MIB

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Standards	• IEEE 802.1D Spanning Tree Protocol • IEEE 802.1p CoS Prioritization • IEEE 802.1Q VLAN • IEEE 802.1s • IEEE 802.1w • IEEE 802.1x • IEEE 802.1AB (LLDP) • IEEE 802.3ad • IEEE 802.3ah (100BASE-X single/multimode fiber only) • IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports • IEEE 802.3 10BASE-T specification • IEEE 802.3u 100BASE-TX specification • IEEE 802.3ab 1000BASE-T specification • IEEE 802.3z 1000BASE-X specification	• 100BASE-FX (SFP) • 1000BASE-SX (SFP) • 1000BASE-LX/LH (SFP) • RMON I and II standards • SNMPv1, SNMPv2c, and SNMPv3

Table 5. Safety and Compliance

Description	Specification
Safety Certifications	• UL 60950-1, First Edition • CUL to CAN/CSA 22.2 No. 60950-1, First Edition • TUV/GS to EN 60950-1, First Edition • CB to IEC 60950-1 with all country deviations • AS/NZS 60950-1, First Edition • CE Marking • NOM (through partners and distributors)
Electromagnetic Compatibility Certifications	• FCC Part 15 Class A • EN 55022 Class A (CISPR22) • EN 55024 (CISPR24) • AS/NZS CISPR22 Class A • CE • CNS13438 Class A • MIC • GOST • China EMC Certifications
Environmental	Reduction of Hazardous Substances (ROHS) 5
Telco	Common Language Equipment Identifier (CLEI) code
Warranty	Limited lifetime hardware warranty

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Service and Support

Cisco is committed to minimizing total cost of ownership (TCO). Its portfolio of technical support services helps ensure that its products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in Table 6 are available as part of the Cisco Desktop Switching Service and Support solution and are available directly from Cisco and through resellers.

Table 6. Cisco Services and Support Programs

Service and Support	Features	Benefits
• Cisco Total Implementation Solutions (TIS), available direct from Cisco • Cisco Packaged TIS, available through resellers • Cisco SMARTnet® and SMARTnet Onsite support, available direct from Cisco • Cisco Packaged SMARTnet support program, available through resellers • Cisco SMB Support Assistant	• Project management • Site survey, configuration, and deployment • Installation, text, and cutover • Training • Major moves, adds, and changes • Design review and product staging • 24-hour access to software updates • Web access to technical repositories • Telephone support through the Cisco Technical Assistance Center (TAC) • Advance replacement of hardware parts	• Supplements existing staff • Helps ensure that functions meet needs • Mitigates risk • Helps enable proactive or expedited issue resolution • Lowers TCO by taking advantage of Cisco expertise and knowledge • Helps minimize network downtime

Ordering Information

Table 7 gives ordering information for Cisco Catalyst 2960 LAN Lite Switches.

Table 7. Ordering Information for Cisco Catalyst 2960 LAN Lite Switches

Part Numbers	Description
WS-C2960-24-S	• 24 Ethernet 10/100 ports • 1 RU fixed-configuration • LAN Lite Image installed
WS-C2960-24TC-S	• 24 Ethernet 10/100 ports and 2 dual-purpose uplinks (each dual-purpose uplink port has one 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active) • 1 RU fixed-configuration • LAN Lite Image installed
WS-C2960-48TC-S	• 48 Ethernet 10/100 ports and 2 dual-purpose uplinks (each dual-purpose uplink port has one 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active) • 1 RU fixed-configuration • LAN Lite Image installed
RCKMNT-1RU=	Spare rack-mount kit for the Cisco Catalyst 2960 Series
RCKMNT-REC-1RU=	1 RU recessed rack-mount kit for the Cisco Catalyst 2960 Series
GLC-LH-SM=	1000BASE-LX/LH SFP transceiver module for MMF and SMF, 1300-nm wavelength
GLC-SX-MM=	1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength
GLC-T=	1000BASE-T SFP transceiver module for Category 5 copper wire
GLC-GE-100FX=	100BASE-FX SFP module for Gigabit Ethernet ports, 1310-nm wavelength, 2 km over MMF
GLC-FE-100FX=	100BASE-FX SFP module for 100-Mb ports, 1310-nm wavelength, 2 km over MMF
CAB-SM-LCSC-1M	1m fiber single-mode LC-to-SC connectors
CAB-SM-LCSC-5M	5m fiber single-mode LC-to-SC connectors

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For more information about Cisco products, contact:

- United States and Canada (toll free): 800 553- 6387
- Europe: 32 2 778 4242
- Australia: 612 9935 4107
- Other: 408 526-7209
- URL: http://www.cisco.com

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Europe Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: +31 0 800 020 0791
Fax: +31 0 20 357 1100

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